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local interest as water works are soon to be established with the water supply from this source. The free excursion to the Saginaw valley will give the botanists a favorable opportunity to see the characteristic flora of Michigan. The steamer excursion, after adjournment, to Mackinac island and Sault Ste. Marie promises to be one of the most delightful ever offered the association. Every botanist who can command the time should certainly go, as the flora of that region is characteristic and specially interesting, the trip inexpensive, and the social and physical pleasures all that can be desired. The trip may be made in three or four days, but more time can be profitably spent. With such a favorable prospect it is safe to predict a most enjoyable and successful meeting, with a fair probability that the botanists will hold their recently gained vantage of ten per cent. of the total attendance.

CURRENT LITERATURE.

Louis Pasteur, His Life and Labors. By his son-in-law. Translated from the French by Lady Claud Hamilton. D. Appleton & Co., New York, 1885. 8° Pp. xlii, 300.

Every reader must be charmed with this work. Its enthusiastic portraiture of the successes of a remarkable man, a man who does not tolerate failure, the glowing account of his devotion to the work of his life, the pertinacity with which he defends his views against all opponents, and the great pecuniary and commercial value of his discoveries, invest the work with more than usual interest. The chapter on the silkworm disease reads like a romance, ending with that sad stroke of paralysis which so nearly cost the hero his life. The silkworm disease had gradually reduced the silk industry of France till it yielded barely one-fifth the usual revenue, and, as many districts were largely dependent upon this source of maintenance, its failure entailed the greatest poverty and suffering upon the inhabitants. It was at the close of the famous controversy on spontaneous generation, in which Pasteur was so signally triumphant, that he undertook to solve the problem of this mysterious disease. We can not follow him through the successive steps of the difficult investigation to the final restoration of wealth and prosperity to the silkworm districts, but can assure the reader that the story is so fascinatingly told that whoever begins it is not likely to lay the book down before its completion.

The other great subjects of Pasteur's studies—fermentation, studies of wine and beer, splenic fever, fowl cholera, hydrophobia—are almost equally interesting. But it is only possible in this notice to call attention to the general nature of the work. The casual reader will find few technicalities to detract from the smoothness of the narrative, while to the student of bacteriology it is suggestive and stimulating. The value of the work is much enhanced by the admirable introduction by Professor Tyndall.

Micro-organisms and Disease, an Introduction into the Study of Specific Micro-organisms. By E. Klein, M. D., F. R. S. 2d ed. Macmillan & Co., London, 1885. Small 12°. Pp. 201. Illustrated.

Among the numerous works on pathogenic bacteria, which are being so rapidly turned out, this small book deserves an important position. The author is an experienced investigator who knows of what he writes, having been employed by the English government for many years to conduct such studies. The work opens with several concise but well written chapters on the examination

of bacteria, the materials, apparatus and methods of artificial cultures, and the means of inoculation and observation. These are ample to direct the investigator into the right course, and to give the reader a just appreciation of the difficulties which beset this kind of work.

The body of the book is given to the discussion of the various pathogenic species of bacteria and the more common, closely-related non-pathogenic forms, arranged upon the basis of Cohn's classification. Some space is also given to certain higher fungi having more or less relation to the health of the higher animals and man, such as yeast, *Oidium lactis*, *Aspergillus*, *Actinomyces* and *Saprolegnia*. The systematic part of the work is profusely and admirably illustrated with cuts that are well drawn, clear and finely printed.

The latter part of the book is devoted to a discussion of the rôle of septic and pathogenic forms, and will be found an excellent resumé of the present knowledge of the subject. The grounds of Buchner's belief, that septic organisms may, by attention to certain conditions of culture, be changed into pathogenic forms, as, for example, the harmless hay bacillus into the malignant anthrax bacillus, are reviewed and shown to be untenable, a conclusion already reached by DeBary and quite generally accepted by botanists, even by Zopf in the last edition of his *Spaltpilze*, contrary to the author's statement. After the examination of several other supposed cases of transformation of harmless into harmful bacteria, Dr. Klein very sensibly concludes that "some definite micro-organisms have the power, when finding access into the body of a suitable animal, to grow and thrive and to induce a definite pathological condition. But this power they have *ab initio*. Those that do not possess it can not acquire it by any means whatever."

In conclusion we can most heartily commend the work to those who desire to become acquainted with the principal forms of pathogenic bacteria.

Die Spaltpilze, nach dem Neuestem Standpunkte Bearbeitet. Von Dr. W. Zopf. 3d ed. Eduard Trewendt. Breslau, 1885. Roy. 8°. Pp. 127. Illustrated.

This work was primarily written for the *Encyklopaedie der Naturwissenschaften*, and separately published in March, 1883. It met with such ready sale that in a few months the edition of 1,000 copies was exhausted, making it necessary to issue a second edition in January, 1884.

This was as eagerly sought for as the first, and but a year had passed when a third edition was demanded. Each successive issue has been improved and enlarged, especially the last, which contains one-fourth more pages and seven more wood cuts.

The work is devoted to the general treatment of the bacteria. It opens with the consideration of their position in the plant system and their occurrence in nature. The main portion is divided into four parts—morphology, physiology, methods of investigation, and descriptive classification.

The author takes up Cohn's theory of the constancy of bacteria forms, and his classification into coccus, rod, thread and spiral groups (monomorphism), and points out that they have now only historic value, as any two or more of these groups may have genetic relationship (pleomorphism). The author, however, disavows any intention to adopt ultra-pleomorphic views, believing that for certain bacteria pleomorphism is surely proven while for certain other bacteria it can not at present be demonstrated. Yet in the latter case it may possibly be found, upon further investigation, that a similar variability does really occur. This possibility has its advantages, for, while it does not alter the facts, it does give an incentive to more exhaustive study. The classification which the author adopts, founded upon the structure and degree of development, is given elsewhere in this journal.

Under morphology the author treats of the forms and their metamorphoses, vegetative multiplication, growth, color, contents, and structure of the cells, organs of movement, formation of spores, and zoogloea condition. Under phys-

iology is given the nourishment of bacteria, their influence upon the medium in which they grow, their relation to temperature, gases, light, electricity, chemical substances and moisture. Under methods of investigation is a careful statement of the principal methods of work and observation. The part devoted to the description of species is far more satisfactory to the systematist than the usual treatment in pathological works. Each species has been studied from the botanist's standpoint, and has been assigned its proper place in the system, so far as present facts admit.

An important part of the work is the bibliography of bacteria, including a list of nearly 350 authors. An excellent index completes the volume.

The Technology of Bacteria Investigation; explicit directions for the study of bacteria, their culture, staining, mounting, etc., according to the methods employed by the most eminent investigators. By Charles S. Dolley, M. D. S. E. Cassino & Co., Boston, 1885. 12°. Pp. 263.

The author says in the preface that the work has been written with the hope that it will stimulate careful study of the schizomycetes by American investigators. There can be no reasonable doubt that such manuals will have this tendency. The subject of bacteriology is exciting such universal attention that even in America we must ere long catch the general enthusiasm, and lend ourselves to the fascinating but difficult study of the "infinitely little." A few Americans have already done excellent work in this field, although one does not often find them mentioned by foreign authors. Let us see what help Dr. Dolley offers the student.

The work is divided into three parts: (a) General and (b) special methods of investigation, and (c) formulary. Under the first we have the study of microscopic preparations, both living and stained, and also by means of photography, followed by culture experiments, inoculation and biological analysis. Following each topic is the literature pertaining to it. The second part treats of the special methods used by different investigators in studying anthrax, cholera, glanders, hydrophobia, leprosy, malaria, tuberculosis, typhoid fever, diphtheria, erysipelas, yellow fever, etc., etc., each being followed by the literature of the subject. The third part contains about fifty formulæ for the preparation of stains, reagents, culture media, etc.

The value of such a work naturally turns upon the fullness and perspicuity with which the methods and apparatus are described, and upon their proper selection. The present work is excellent, so far as it goes, and will prove of great value to many investigators, but it still leaves much to be desired. The descriptions are short and sometimes quite inadequate; there are no illustrations, which in many instances would be as valuable as the descriptions; the work is evidently compiled from literature alone, and lacks that fullness of detail which the author could only give from personal knowledge of the manipulations; there is no index. The bibliography occupies one-third of the volume; a wholly unnecessary amount, as it is printed in full-size type, which, besides taking up extra room, obscures the clearness of the page.

Yet, whatever the defects are, this is a timely and welcome volume, one that will prove of service to the investigator, especially the beginner, and one that will foster the study of the subject.